FIRST-YEAR EVALUATION OF TREE AND VINE GROWTH AND NEMATODE DEVELOPMENT FOLLOWING 17 PRE-PLANT TREATMENTS

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In a two hectare plum replant site three separate experiments were conducted. On half the site trees were removed, soil was ripped to 0.7 m depth and a dual application of 366 kg/ha methyl bromide (MB) was compared to 40 days flooding or a 732 kg/ha drench of methyl isothiocyanate (MIT). The plot was split with rootings of Nemaguard Peach, Black Walnut, Dr. Huey Rose, Marianna 2624 Plum, and Teleki 5C Grape either replanted in 6 mo. or after 18 mo. of crop rotation involving Barley, Sorghum x Sudan and Cahaba White Vetch.

On the adjacent one hectare the existing plum trees received a foliar spray of 2% glyphosate 60 days before their removal. The field was then planted to barley. After discing under the barley, ripping to 1.3 m and resettling the soil, treatments were drenched into the surface 1.6 m of soil profile. To this half the field all trees and vines were replanted a full 18 mo. after tree removal. Six months after the glyphosate treatment there was 80% kill of old Nemaguard roots and 40% kill of old plum roots. Populations of *Pratylenchus vulnus* nematode were still present within the root systems two full years after the glyphosate treatment. Populations of *Tylenchulus semipenetrans* nematode also remained alive around the plum roots two years after the glyphosate.

Each October after replanting the growth of five reps of each of five plant cultivars was destructively sampled. Plant growth was compared to the nontreated that were replanted 6 mo. after tree removal. For example, several treatments produced plants that were 7 to 11 times larger than the nontreated. The multiple for plant growth improvement was averaged across the five plant cultivars to provide a single value which depicts relative plant growth.

Four treatments provided nematode control one year after treatment that was 99% of the nontreated. These four treatments also provided plant growth 7.0 to 8.5 times

better than the nontreated that was planted 6 mo. after tree removal. The four comparable treatments included: 1) MB at 366 kg/ha followed by an 18 mo. crop rotation; 2) MIT at 732 kg/ha followed by 18 mo. crop rotation; 3) Glyphosate-treated site followed by a drench of emulsified 1,3-D at 366 kg/ha and 4) MB at 366 kg/ha replanted after 6 mo.

A fifth treatment, glyphosate followed by acrolein drench at 366 kg/ha gave plant growth of 8.3 times the nontreated but after one year the nematode control averaged only 50% among the three most susceptible hosts.

Three treatments that provided plant growth comparable to the above-mentioned but provided no long-lasting nematode relief included: 6) 40 days flooding then 13 mo. sorghum x Sudan and vetch; 7) glyphosate followed by MIT drench at 366 kg/ha and 8) glyphosate followed by 18 mo. fallow.

Replanting 3 m away from the old tree row provided 2.6 times more growth in the first year but no nematode relief.

Flooding for 40 days and planting within two months did not provide kill of remnant roots or nematode reductions and plant growth was only 1.4 times the nontreated.

Fallowing or crop rotation for 18 mo. greatly improved growth of replants but didn't provide adequate nematode relief against endoparasitic nematodes which remained in roots.

A drench of urea gave 95% nematode relief in soil but didn't reduce populations of endoparasitic nematodes within roots. A drench of marigold tea plus urea followed in one month by 1 ha-m irrigation gave control of soil-dwelling nematodes without creating a biological vacuum. Plant growth of 4.6 times the nontreated indicated, however, that a phytotoxic residue remained in the soil.

A drench with 366 kg/ha chlorine gave surprising benefit to the growth of peach but nematode control in soil and in remnant roots was inadequate. Drenches are very useful in sites where 15 cm water can be delivered within 8 hr. These drenches were each delivered throughout the surface 1.7 m of soil using a portable soil drenching device.